

Title

Apparatus for receiving, storing and providing bags of blood

DESCRIPTION

The present invention refers to an automated and computerised apparatus for receiving, preserving and supplying bags of blood.

Around 1996, the company Angelatoni developed an apparatus of this type; this consisted substantially of a refrigerator inside which there was a rotating magazine equipped with cells for containing the bags of blood; the refrigerator was controlled by a Personal Computer by way of a series of electrical connections; an electrical connection was provided for each sensor and an electrical connection for each actuator; all the electrical connections were grouped in two large multi-wire cables. The product was commercially very successful.

The approach followed in the designing of that apparatus is the conventional one which is used when a computerised machine-tool is designed: that is to say, the mechanics are separated from the electronics and the sensors and actuators are placed at the interface. Such an approach is very sensible; in fact, the mechanics and the electronics have little in common; in general there is no advantage in placing them close to one another (on the contrary, it may be difficult), and it is quite often necessary to keep them distant from each other.

The control program was loaded onto the PC connected to the apparatus; the PC was of conventional type and therefore it was very easy to load other software of commercial type.

A freezing unit, for the long time preserving of blood products (for example, plasma) is disclosed in the German patent application No. 4418005 to Scheuer Uwe, wherein the fresh blood drawn from a donor is stocked, frozen and waits for a classification.

Recently, Angelantoni decided to place on the market a new version of that machine and therefore carried out some research activity in order to improve it.

As a result of this activity, it was realised that such an apparatus for bags of blood is very different from a computerised machine tool.

Firstly, its principal activity (that is to say, preserving the bags of blood at the

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correct temperature) is carried out in the absence of an operator.

This activity is very important and therefore safety and reliability of the apparatus are key factors.

The apparatus is typically placed in locations with free access.

Claims

1. An apparatus for receiving, preserving and supplying bags of blood, comprising:

- . a cabinet(2)for containing all the components of the apparatus,

- . a refrigerated space (21)for containing the bags,

- . a magazine (3) comprising a plurality of cells (31), each capable of containing a single bag, the magazine (3) being housed inside the refrigerated space (21), each of the cells (31) being identified by a cell code, and wherein the cells (31) are structured in superposed levels, the cell code is univocal, the cell code is independent of the level in which the cell(31)is located and of the position of the cell (31) in the level and wherein cell identification means (32) capable of retrieving and/or containing cell codes, preferably bar codes, are placed at the cells(31).

- . at least one door (4) for allowing access by an operator to the cells (31),

- . a movement system(5) housed inside the cabinet(2)and capable of moving, preferably rotating, the cells (31),

- . a cooling system(6)housed inside the cabinet(2)and capable of cooling the refrigerated space(21),

- . a processing system (7)housed inside the cabinet(2), capable of controlling the movement system (5) and the cooling system (6)

- . a reading device (10) for reading bag identification means, said device being connected to the processing system(7), housed inside the

cabinet(2) and placed at walls (23) of the cabinet(2),

characterized in that it further comprise

- . at least one reading device(132) for reading cell identification means (32) and connected to the processing system(7),and at least one corresponding movement member (131) for said reading device (132) controlled by the processing system (7), said device and said member being housed inside the refrigerated space(21),
- . said apparatus comprising a machine space(22) separated from the refrigerated space (21), said machine space (22) further comprising the movement system (5), the cooling system (6) and the processing system(7).
- 2. An apparatus according to claim 1 wherein the processing system(7) is capable of controlling the receiving, preservation and supply of the bags and is connected to a keyboard (8) and a screen (9),both placed at the walls (23)of the cabinet (2).
- 3. An apparatus according to one of the preceding claims, comprising a metal container capable of completely containing the processing system(7).
- 4. An apparatus according to one of the preceding claims, comprising a network port (11) of the wire-free type for connecting the processing system (7) to a computer network.
- 5. An apparatus according to one of the preceding claims, comprising a modem (12) of the wire-free type for connecting the processing system (7) to a telephone network.

6. An apparatus according to one of claims 1 to 5, comprising only one door (4) which extends from the first to the last level of the magazine(3), wherein one cell (31) of each level is notional and wherein the movement system (5) is capable of rotating a single level at a time.
7. An apparatus according to one of the preceding claims, wherein the processing system (7) comprises a sub-system for thermal control of the refrigerated space(21), said sub-system being independent of, but in communication with, the processing system(7).
8. An apparatus according to claim 7, wherein the thermal control sub-system is equipped with an emergency power source.
9. An apparatus according to one of the preceding claims, wherein the processing system (7) comprises a control program equipped with a communication module capable of communicating with a management program typically by way of a network port.
10. An apparatus according to claim 9, wherein the communication module is a software element independent of the control program and is capable of being actuated by the control program during the execution of the control program.
11. An apparatus according to claim 10, wherein the control program is equipped with a software interface that is fixed and predetermined for interacting with the communication module.